

m. t. = Median tooth.

o. b. l. = Outer barbated lobes.

r. m. = Relaxing muscle.

Plate VI. Photomicrographs of the contents of the digestive canal of cricket. Figs. 1, 2, 3 crop, proventriculus and mesenteron of cricket fed on miscellaneous food. Fig. 4, crop of cricket fed on dead insects.

Plate VII. Fig. 1 mesenteron of cricket fed on dead insects. Figs. 2, 3, 4 crop, proventriculus and mesenteron of cricket fed on wheat grains.

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## NEW POLYDESMOID DIPLOPODS FROM TENNESSEE AND MISSISSIPPI.

BY RALPH V. CHAMBERLIN,  
Museum of Comparative Zoölogy.

Of the following underscribed species of millipedes one was collected in Mississippi at Agricultural College by Mr. J. W. Bailey, while the other four, three of them pertaining to a new genus, were taken by Professor R. Thaxter at Burbank in eastern Tennessee. The new genus is segregated from *Fontaria* sens. lat.

### *Fontaria pela* sp. nov.

This species when in full color is above deep shining black with the caudal corners of the carinæ and the tip of the last tergite in life apparently bright red, fading in alcohol to brown or orange. There may or may not be a narrow stripe of the same bright color across the anterior border of the first tergite. The lateral region of each somite is in the main reddish or orange brown with a black stripe down the caudal portion from carina to legs, and a less distinct dark stripe in some along the anterior border as well. The antennæ are somewhat chestnut and the legs are brown.

The body is proportionately rather slender. It is parallel-sided excepting at the ends which are narrowed. The lateral carinæ are moderate in size; the caudal margins of the anterior ones are bent forward, those of the middle region less so, and those of the posterior ones first straight and then bent caudad, the posterior angles of the

last three acutely produced in increasing degree. Carinæ all depressed.

Head smooth and shining. Vertigial sulcus distinct, ending between antennæ often in a weak pit-like depression, a more obscure sulcus running from here to each antenna, the two forming a very obtuse angle. No occipital foveolæ detected in types.

In the male the genital processes of the second coxæ are short and cylindrical. The sternites are without processes excepting for low paired rounded bulgings on the third, fourth, and fifth somites. Coxæ unarmed.

The gonopods of the male are strongly pilose with long hairs on the mesal side at base, while the coiled blade is more sparsely provided with very short hairs. The blade of each gonopod curves ventrad and then across the other one, again bending dorsad and then back toward its own side as far as the middle line where it curves again ventrad at its tip; it narrows gradually distad, becoming slender, but near the end expands a little into a slightly lanceolate head which is acute and at the base of which on the concave side is a short tooth or spine; it is flattened throughout. The basal spine is rather stout and somewhat flattened with the acute apex bent at right angles to the main axis, and in some showing also a small acute point in line with the latter.

The males are ordinarily obviously smaller than the females.

Length of type (male) about 34 mm.; width, 7.25 mm. Length of a female near 40 mm., with the width 9 mm. The maximum male is 41 mm. long and 8.5 mm. wide.

*Locality*: East Tennessee; Burbank. Numerous specimens collected by Dr. R. Thaxter.

#### **Fontaria ochra** sp. nov.

The types are in general fulvous, with the legs and antennæ yellow, in most somewhat darker across the anterior region of the somites, though in the darkest individual of all the darkest part of the somite is in a narrow stripe slightly in front of the caudal margin. The general color appearance is much like that of *F. crassicutis* Wood. The carinæ in some are somewhat paler than the intervening region.

Body obviously narrowed at both ends, the sides over most of the length being parallel or nearly so. Lateral carinæ moderately

large, not raised at angle to general slope of somites excepting in caudal region. Posterior margin of carinæ in anterior region straight, slightly bent caudad in middle region, more so in posterior region, but only the last few acutely angularly produced.

Vertigial sulcus distinct, ending abruptly at or a little above upper level of antennal sockets. Occipital foveolæ 2+2.

In the male the sternites and the coxæ are without special processes.

In the gonopods of the male the principal or distal division is stout at the base and narrows gradually distad; it extends ventrad and then curves across to the other gonopod and then coils dorsad; near the point where it begins the bend dorsad it is somewhat geniculate, the portion beyond the geniculation being more slender and somewhat doubly or sigmoidally curved with the acute tip bend mesad almost at right angles; it is densely pilose at base on the mesal side and less strongly so along the edge to near the level where the bend across to the other side begins. The basal process is short, straight and acute and extends obliquely caudomesoventrad to near the tip of the principal process of the opposite gonopod.

Length of type (male) about 35 mm.; width, 10 mm.

*Locality*: Mississippi: Agricultural College. Six specimens collected in the fall of 1916 by J. W. Bailey.

#### Nannaria gen. nov.

Genotype—*N. minor* sp. nov.

In addition to the type species, *Fontaria tennesseensis* Bollman, *N. media* sp. nov. and *N. infesta* sp. nov., described below, belong in this genus. These forms are all small in comparison with *Fontaria* and are characterized in the main by the structure of their male gonopods in which the principal process is rather short and nearly straight or only moderately curved, never coiled, and not ordinarily passing the median line or crossing that of the other side, and in which the basal process is relatively long and slender. The genus will be critically defined and discussed in another place.

#### Nannaria minor gen. et. sp. nov.

This is a small species comparable in size to *F. tennesseensis*. The general color of the dorsum in the types is a dull, in one speci-

men somewhat smoky brown with the lateral carinæ paler, yellowish. A dark median longitudinal dorsal line is evident in the posterior portion. Antennæ and legs yellowish.

A slender species narrowed decidedly at the ends but elsewhere uniform in width. The posterior margins of the anterior somites are bent back slightly, those of the succeeding ones in going caudad more and more strongly so. The posterior corners of the last three pairs of carinæ strongly produced caudad but not acute, the distal ends being strongly rounded, the corners of the others more angular.

Vertigial sulcus ending as usual at the angle of a transverse arcuate sulcus between the antennal sockets, the latter sulcus much weaker than the vertigial and becoming obscure toward the ends.

In the male the sternites in the region caudad of the gonopods are produced at the ends, adjacent to the legs, caudad into sharp, straight conical processes; on the anterior half of the fourth somite are two distally rounded, subconical processes. The genital processes of the second coxæ are slenderly conical and short and project subcaudad. Coxæ unarmed. In what is regarded as the female of this species the sternites are not produced but the coxæ of the middle and posterior regions are at their distal ends produced ventrad into acutely tipped conical processes which decrease in size in going cephalad.

The species is readily distinguished by the character of the male gonopods. The principal branch is above the basal joint subcylindrical to below middle of length where it is abruptly narrowed into a slender blade which is moderately curved, but not at all coiled, its acute tip meeting that of the opposite gonopod at the median line. The caudal branch is long though not quite reaching the end of the main branch; it presents a decided double or sigmoid flexure, the acute tip bending across that of the other one; at the level of the first flexure on the ventral side there is a short acute spur.

Length of type (male) near 27 mm.; width, 5.5 mm.

*Locality:* East Tennessee: Burbank. A male and female collected by Dr. R. Thaxter.

*Nannaria media* sp. nov.

When in full color this species is deep chestnut above with the posterior corners of the lateral carinæ yellow. Beneath the color

is yellowish brown. On each somite between carina and legs of each side two dark stripes, one anterior and one posterior in position. The legs are brown, the anterior ones more reddish or chestnut, the antennæ typically still deeper in color.

The body is slender as in *minor*. The posterior margins of the lateral carinæ in the anterior region are straight, in going caudad becoming more bent back as usual though none of the posterior corners are really produced excepting those of the last three pairs of carinæ. The processes of the last three pairs of carinæ are broad and blunt, but not so evenly rounded as in *minor*, the mesal edge between apex and base bulging more than in that species.

The vertigial sulcus is deep. It bifurcates into two weaker sulci below, these not forming a distinct arcuate sulcus, the ends not evidently approaching the sockets of the antennæ as transverse lines. Occipital foveolæ 2+2.

In the male none of the sternites bear processes in either the posterior or anterior regions. The processes of the second coxæ are very short and comparatively thick. Coxæ unarmed in both sexes.

The male gonopods in general similar to those of *minor* but the principal branch not abruptly narrowed below a cylindrical base, the process gradually narrowing from base to the apex and geniculate near beginning of distal third of length, the apex not meeting that of the other gonopod. The distal portion flattened in a sub-vertical plane, distally truncate with upper and lower corners minutely acutely produced; also a point below a little proximad of end. The posterior spine is very slender and finely acutely pointed, and is nearly straight above its base, running subparallel to the main process than which it is much shorter, but the extreme apex curving somewhat ectad.

Length of type (male) about 30 mm.; width, 5 mm.

*Locality*: East Tennessee: Burbank. Two males and a female collected by Professor R. Thaxter

#### *Nannaria infesta* sp. nov.

Carinæ and caudal borders of metazonites dilute red, probably bright red in life; metazonites elsewhere olive, the dark color intruding on the carinæ anteriorly; prozonites olive grey.

Body slender, more strongly narrowed cephalad and caudad than in media, the attenuation caudad being especially pronounced and gradual. The processes of the last carinæ shorter and much broader than in media; the processes of the two preceding segments differ in having the mesal margin much less oblique and more nearly symmetrical with the outer one, caudally rounded. The caudal extension of the posterior ends of the carinæ begins farther forward than in media.

Vertigial sulcus very deep, ending below on a level with the centers of the antennal sockets, not truly bifurcate through there is a vague fine line from its lower end to each antennal socket.

Sternites without processes.

Principal processes of gonopods gradually narrowing distad much as in media, but the glabrous distal region shorter and curving more abruptly and more decidedly mesad, the distal, subvertical edge not obtusely excised as in media. The minor dorsal (anterior) processes more slender than in media and not subparallel, extending each obliquely mesodistad.

Length of type (male) near 35 mm.; width, 5.5 mm.

*Locality:* North Carolina: Cranberry (Coll. Aug. 6, 1896. Rec'd for study through Prof. R. Thaxter.)

The type is abundantly infested with an Empusa. It is in the collection of the Department of Cryptogamic Botany at Harvard University.

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## A NOTE ON *LIMATUS DURHAMI* THEOBALD.

BY C. S. LUDLOW.

An interesting omission in the available descriptions of this species, so far as the English and American authorities at least are concerned, was brought to my attention by the receipt of specimens sent by Colonel W. H. Wilson, M. C., United States Army, from the Canal Zone.

Neither in Mr. Theobald's description<sup>1</sup> nor in that given by Howard, Dyar and Knab<sup>2</sup> is mention made of a very noticeable and

<sup>1</sup> Theobald, F. V., Monograph, *Culic.* II, p. 349. 1901. *Ibid.*, III, p. 333. 1903.

<sup>2</sup> Howard, Dyar and Knab, Monograph, *The Mosquitos of North and Central America and the West Indies*, III, p. 40. 1912.